

## Three New Pacific Species of *Halgerda* (Opisthobranchia: Nudibranchia: Doridoidea)

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**Abstract.** Three new species of *Halgerda* are described: *H. batangas*, a reticulate red-spotted species from the Philippines; *H. okinawa* a species from 53–76 m depth at Okinawa; and *H. johnsonorum*, a nocturnal *H. willeyi*-like species from the Marshall Islands with a relatively smooth dorsum. A specimen of *H. willeyi* Eliot, 1904, from Okinawa is described and illustrated for comparison with *H. johnsonorum*.

### INTRODUCTION

Species of the genus *Halgerda* Bergh, 1880a (= *Dictyodoris* Bergh, 1880b) are found throughout the tropical Indo-Pacific, as well as one in South Australia. Recent discussions of the genus can be found in Rudman (1978), Willan & Brodie (1989) and Carlson & Hoff (1993). Three new *Halgerda* species are presented in this paper, two from the Western Pacific and one much further east from the Marshall Islands.

Because the reproductive systems are similar but distinctly different among species, two figures are presented in order to show the distinctions. The first is a dorso-posterior view with the albumin-mucus gland pulled apart from the bursa copulatrix and prostate gland mass in order for the uterine duct and receptaculum to be seen. In most drawings the ampulla has been pulled down and away from the posterior of the mass and the receptaculum seminis is unburied. A second figure views the genital system from the right side.

The radulae of the species described in this paper are typical of the genus in having very small teeth at the middle, gradually becoming larger toward the center of the half row and remaining large until near the end of the row. All are simply hamate with a flange on the inner edge of all except the outer laterals. Because the outer laterals may show distinction between species, they have been illustrated.

### SPECIES DESCRIPTIONS

*Halgerda okinawa* Carlson & Hoff, sp. nov.  
(Figures 1–5)

?*Halgerda graphica* Basedow & Hedley, Eliot, 1913:12.

Non *H. graphica* Basedow & Hedley, 1905.

*Halgerda* sp. Gosliner, et al., 1996:160, fig. 563.

**Distribution:** *Halgerda okinawa* has been recorded from

Indonesia (Gosliner et al., 1996) and Okinawa (present study).

**Specimens:** Seven specimens collected at Seragaki, Okinawa, Japan were furnished by Dr. Robert Bolland (all sizes are from the living animals). 110 mm, 67 m depth, 7 July 1996; 98 mm, 76 m, 22 July 1996, dissected; deposited as paratype, Bishop Museum, Honolulu, BPBM 254044; 86 mm, 58 m, 14 January 1997; deposited as holotype, Bishop Museum, Honolulu, BPBM 253722; 66 mm, 73 m, 2 March 1997; deposited as paratype, Bishop Museum, Honolulu, BPBM 253723; 125+ mm and 114 mm, 53 m, 31 May 1997; 71 mm, 72 m, 10 April 1998.

**External morphology:** The living animal (Figures 1, 2) is oblong-ovate with a mantle that lies along the substrate. The body is smooth, firm, and gelatinous. The dorsal surface has the typical ridges and depressions found in most *Halgerda* with the junctures sculptured with tubercles of varying height. The rhinophores arise out of a low smooth sheath, the branchia from a high smooth sheath. The rhinophore club is narrower than the base and has a slight posterior angulation. The branchia are divided into four main gills, the anterior having secondary branches and the posterior having two major branches with some secondary branching.

The body is translucent white. The upper part of the tubercles is yellow which gradually diffuses into the white of the body. The yellow is internal and may or may not extend along the ridges between tubercles. Dark brown streaks of varying thickness line the tubercles. The streaks extend into the yellow of the tubercles though rarely is there any dark pigmentation on the tubercle tip. The streaks also are found along the ridges and reach the depressions between the ridges. Toward the mantle margin the brown streaks become broken, often forming a series of spots. Brown spots may also appear irregularly on the body. The base of the rhinophores is translucent, the lamella yellow. The rhinophore sheath is unmarked except for a small tubercle of yellow postero-laterally on

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Figures 1, 2

*Halgerda okinawa* Carlson & Hoff, sp. nov. Figure 1. Holotype (BPBM 253722). Length 86 mm. Seragaki, Okinawa, 58 m depth, 14 January 1997. Figure 2. Paratype (BPBM 253723). Length 66 mm. Seragaki, Okinawa, 73 m depth, 2 March 1997. Photos by Robert Bolland.

most specimens. There is a posterior solid dark brown line the length of the rhinophores with some scattered dark brown spots on the sides of the stalk. The branchial sheath has a continuation of brown lines from the body as well as some touches of yellow. The branchia are translucent white with dark brown spots on the outer rachis and lines on the inner rachis. The protruding anus is white spotted with dark brown with a touch of yellow on the upper part. There is also spotting on the base of the branchia, sometimes being so concentrated that the base appears a solid dark brown.

Morphological variations occur in terms of the number, size, and sculpturing of tubercles. The 66-mm paratype has a few high pointed tubercles, while in the 86-mm holotype they are low and rounded. Color variation occurs in terms of the number, length, and width of the brown streaks and number of lines on the inner surface of the branchia. The specimen illustrated from Indonesia by Gosliner et al. (1996:160) has yellow branchia as well as what appears to be a band of yellow on the mantle margin. One of the specimens from Okinawa had pale yellow branchia, two showed a touch of yellow on the posterior branchia, and one specimen had gold rather than yellow on tubercles and rhinophores.

Specimens fixed in 10% formalin and preserved in 80% alcohol are translucent white with short dark brown streaks over the dorsum. Yellow was retained in only one specimen. The underside of the mantle is unmarked except for a few dark brown spots/lines at the juncture of mantle and body. The sides of the foot have some dark brown spots, in some cases forming incomplete rings. The genital pore was not marked.

**Internal morphology:** The general internal arrangement

is the same as for other species of *Halgerda* discussed by Rudman (1978) and Carlson & Hoff (1993). The visceral sac has a dusting of dark brown pigment posteriorly near the branchia; otherwise it is mostly transparent. The outside of the oral tube was unpigmented; however, two dark brown spots were found inside. There was also some brown spotting inside the branchial pocket. With the visceral sac open, the large bursa lies on and to the right of the midline. The esophagus and the aorta cross the top of the bursa.

If the bursa is moved slightly away from the buccal bulb and to the right, the radular sac can be seen curling up and slightly to the left. The radula of the 98-mm dissected specimen was about 14 mm long and had a formula of  $45 \times 49.0.49$  with the outer three laterals (Figure 3) reduced and simple.

Within the reproductive system (Figures 4, 5), the ampulla is long and folded. The uterine duct has a few folds and extends up under the vaginal duct where it enters the bursa copulatrix. The receptaculum seminis is peanut-shaped and is embedded in the prostate and albumin/mucus glands. The large bursa copulatrix is enfolded by, but not entirely covered by, the prostate gland. There is no thin layer of prostate over the bursa copulatrix. The prostate is brownish in color where it enfolds the bursa copulatrix and whitish as it folds around the base. The thin vas deferens exits from the heavy brownish prostate on top of the bursa copulatrix. It becomes larger and has one fold before reaching the large penial sheath. The vaginal duct joins the bursa copulatrix directly over the uterine duct. It widens only slightly at its distal end. Very large fleshy folds extend from the genital opening, through the body wall, creating the common genital vestibule. The





Figure 3

*Halgerda okinawa* Carlson & Hoff, sp. nov. Paratype (BPBM 254044). Length 98  $\mu$ m. Radula-outer laterals. Scale = 100  $\mu$ m.

folds come together at the vaginal, mucus gland, and penial openings.

**Discussion:** *Halgerda okinawa* is the only species of *Halgerda* known to the authors that has a color other than the body color as an intrinsic part of the tubercles. Whereas most tubercle color in other species of *Halgerda* is made up of surface pigmentation which may extend a short distance into the tubercle, a section through the tubercles of *H. okinawa* reveals that the yellow pigment extends throughout the tubercle itself and diffuses into the translucent white of the body color. A similar pale yellow can be found on the ridges of many *Halgerda willeyi* Eliot, 1904, but the two species differ in terms of color pattern and dorsal morphology as well as in the genital system. Within the genital system, the almost bare bursa copulatrix, wrapped only in a narrow band of the prostate, separates *H. okinawa* from all other species of *Halgerda* that have been described.

Eliot (1913:12) referred two animals from the "Okinawa Islands" and Otaba to *Halgerda graphica* Basedow & Hedley, 1905. The specimens were described as having ridges with large tubercles at their junction, with both ridges and tubercles yellow. There were bold black lines and spots in the depressions. The rhinophore lamella was black, the lower part striped with black but showing a great deal of yellow. Outer lateral teeth were simple. The visceral sac was "blackish," darker in one specimen than in another. Eliot's description comes very close to *H. okinawa*, the differences being the black lamella on the rhinophores as well as the yellow "base" and the "blackish" visceral sac.

**Etymology:** The specific name *okinawa* refers to the locale where the type specimens were collected.

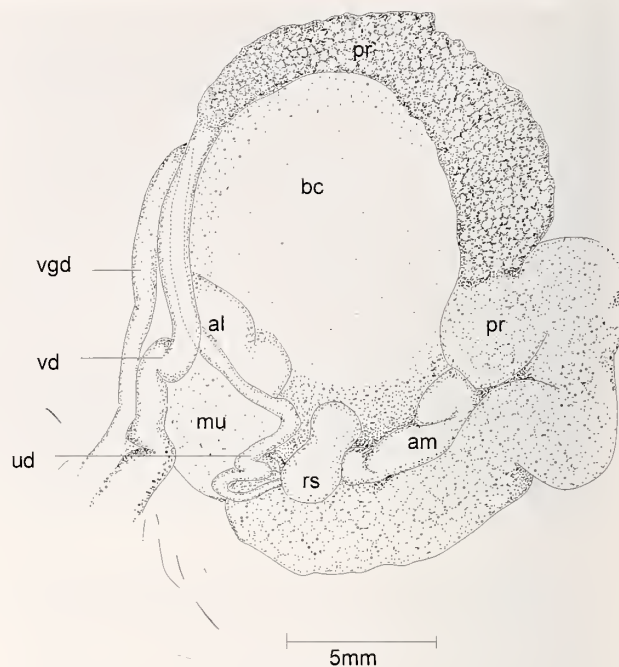


Figure 4

*Halgerda okinawa* Carlson & Hoff, sp. nov. Reproductive system: al, albumin gland; am, ampulla; bc, bursa copulatrix; mu, mucous gland; pr, prostate; rs, receptaculum seminis; ud, uterine duct; vd, vas deferens; vgd, vaginal duct.

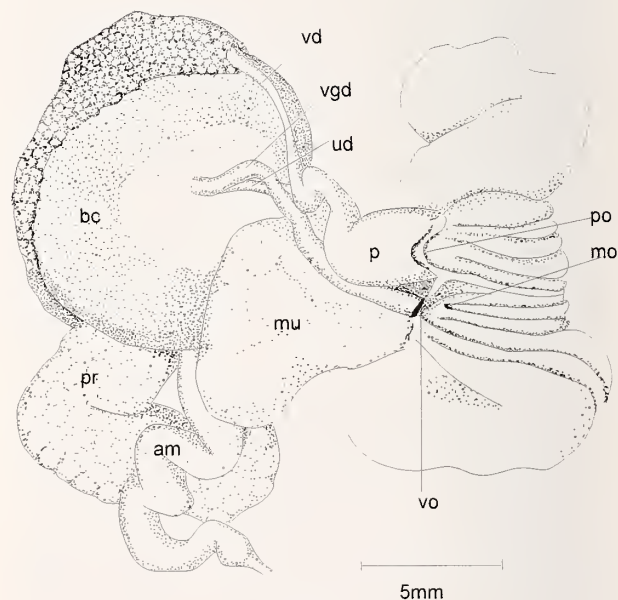
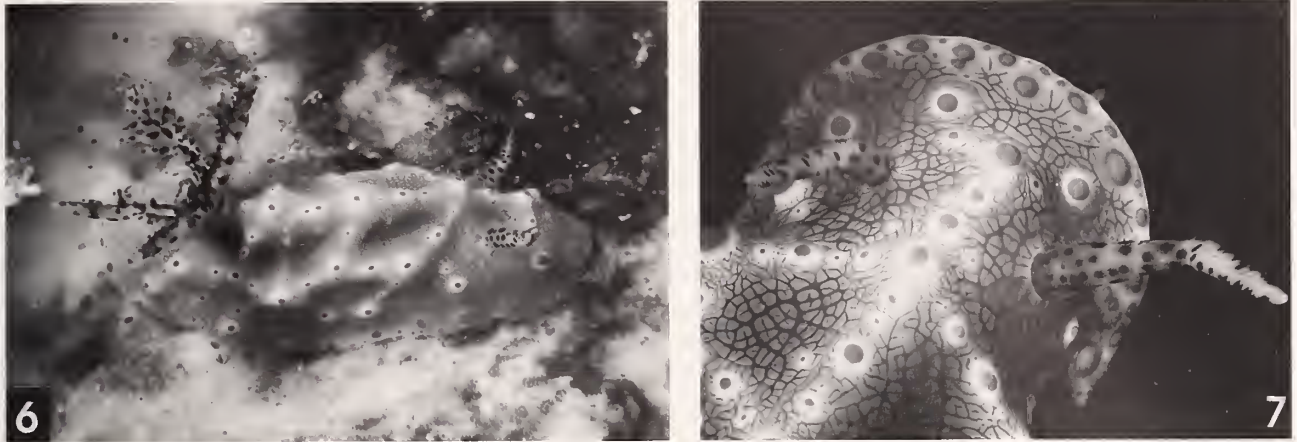


Figure 5

*Halgerda okinawa* Carlson & Hoff, sp. nov. Reproductive system: am, ampulla; bc, bursa copulatrix; mo, mucous gland opening; mu, mucous gland; p, penial sheath; po, penial opening; pr, prostate; ud, uterine duct; vd, vas deferens; vgd, vaginal duct; vo, vaginal opening.



Figures 6, 7

*Halgerda batangas* Carlson & Hoff, sp. nov. Figure 6. Paratype (BPBM 254045). Length 35 mm. Anilao, Batangas, Luzon, Republic of the Philippines, 9 m depth, 23 April 1997. Figure 7. Length 40 mm. Dorsal anterior view to show reticulate markings. Anilao, Batangas, Luzon, Republic of the Philippines, 12 m depth, 22 April 1998.

*Halgerda batangas* Carlson & Hoff, sp. nov.

(Figures 6–11)

*Halgerda* sp. Willan & Coleman, 1984:38, fig. 117.

?*Halgerda* sp. 1. Tan et al., 1987:78, fig. 20.

*Halgerda* sp. Colin & Arneson, 1995:180, fig. 833.

*Halgerda malesso* Carlson & Hoff, Debelius, 1996:257. *Non H. malesso* Carlson & Hoff, 1993.

**Distribution:** This species has been recorded from: Australia (Willan & Coleman, 1984); New Guinea (Colin & Arneson, 1995); the Philippines (present study; Debelius, 1996); and Indonesia (Debelius, 1996). Tan et al. (1987) mentioned an orange-lined *Halgerda* with orange-capped tubercles from Taiwan; the brief description and small color plate could possibly represent *H. batangas*.

**Material:** Three specimens were collected from the Philippines by Gary Williams, Marc Chamberlain, and Debbie Fugitt. Color transparencies of these specimens were made by the authors. One unmeasured specimen from Anilao (Batangas Province) collected in April, 1998, and computer scans of color transparencies of five specimens were made available by Mike Miller, San Diego, California. (Sizes are from the living animals). 40 mm, Philippines, Cebu, Mactan Island, 7 m; 29 April 1997; deposited as holotype Bishop Museum, Honolulu, BPBM 253724; 35 mm, Philippines, Batangas, Anilao, 9 m; 23 April 1997; dissected; deposited as paratype, BPBM 254045; 40 mm, Philippines, Batangas, Anilao, 12 m; 22 April 1998.

**External morphology:** The living animal (Figures 6, 7) is ovate with a smooth, firm gelatinous texture. A 40-mm specimen was 21 mm wide with a foot about 9 mm wide. Both ridges and tubercles are present, the major tubercles occurring at the juncture of the dorsal ridges. Other small-

er tubercles may occur along the ridges or around the base of the major tubercles.

Both rhinophores and branchia arise out of low, smooth sheaths. A small postero-lateral tubercle is present on the rhinophore sheaths of all but one of the specimens we were able to view. The rhinophore club is thinner than the base and has a slight posterior angulation. The apex is somewhat pointed. The branchia has four main gills. In the three specimens examined there was secondary branching in the anterior gills. One of the 40-mm specimens had two major branches in the posterior gills.

The body is translucent white with a fine network of red-orange lines covering most of the dorsal surface. The tubercles are capped in red-orange surrounded by various intensities of white depending on the thickness of the dorsal surface. The foot is lined with orange, and oral tentacles are tipped in orange. Rhinophores and branchia are translucent with sparse dark brown spots. The genital opening is not marked.

Specimens fixed in 10% formalin and preserved in 80% alcohol have lost practically all of the red-orange color except for a couple of flecks on the tip of the largest tubercles. The brown on the rhinophores and branchia is retained as is the fine brown flecking on the visceral sac.

**Internal morphology:** The visceral sac is dark brown with some clear areas. These clear areas match areas of dark brown on the inner body wall. We assume that pigment was transferred to the body wall as an artifact of preservation. The oral tube is unmarked. With the visceral sac opened, it can be seen that the bursa copulatrix is slightly to the left of the midline. The aorta, which is usually found passing over the top of the bursa, in *H. batangas* crosses the bursa along with the esophagus on



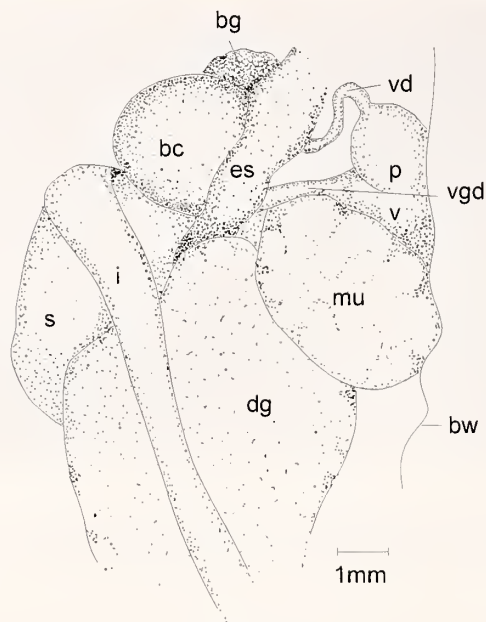


Figure 8

*Halgerda batangas* Carlson & Hoff, sp. nov. Paratype (BPBM 254045). Length 35 mm. Dorsal-dextral view: bc, bursa copulatrix; bg, blood gland; bw, inner body wall; dg, digestive gland; es, esophagus; i, intestine; mu, mucus gland; p, penis; s, stomach; v, vagina; vd, vas deferens; vgd, vaginal duct.



Figure 9

*Halgerda batangas* Carlson & Hoff, sp. nov. Paratype (BPBM 254045). Length 35 mm. Radula-outer laterals. Scale = 10 µm.

the lower right side (Figure 8). The radular sac curls over and to the right.

The radula of the 35-mm dissected specimen was a little under 5 mm long and had a formula of  $59 \times 52.0.52$ . The outer four teeth (Figure 9) were reduced in size with the outer three being flattened, the outermost rodlike, the penultimate bifid, and the antepenultimate irregularly bifid. The left side of the proximal end of the ribbon was folded over and lay across the right side.

Within the reproductive system (Figures 10, 11) the ampulla is short and not convoluted. The uterine duct completes several loops before extending under the thin prostate gland covering the bursa copulatrix. A short tube from the uterine duct leads to the ovoid receptaculum seminis which is embedded in the gland mass between the bursa copulatrix, prostate, and albumin/mucus gland. The entire bursa copulatrix is covered by a thin layer of the prostate with a large prostatic mass folded under it. The vas deferens has one slight fold and terminates in a large penial sheath. The large vaginal duct exits from the thin layer of prostate over the bursa copulatrix. At the point at which it terminates, it is surrounded by a globular gland mass. The openings from the penis and mucus gland are adjacent to the vaginal opening within the genital vestibule. Heavy folds line the common genital vestibule. These folds originate at the genital opening and

some extend into the vagina. Short brown streaks line some of the folds.

**Discussion:** The fine network of lines on the dorsum and characteristics of the genital system distinguish *Halgerda batangas* from other species of *Halgerda*. Two other whitish species of *Halgerda* have been described that have a dorsal network of lines: *Halgerda terrantuentis* Bertsch & Johnson, 1982, and *H. malesso* Carlson & Hoff, 1993. *Halgerda terrantuentis* has relatively heavy gold lines, a submarginal gold line around the mantle, and white capped low tubercles. *Halgerda malesso* has fine orange lines that occasionally fuse to form patches of orange in the depressions, multiple fine submarginal orange lines around the mantle, and orange-capped, moderate to high tubercles. Red-capped tubercles as found in *H. batangas* are also found in *H. carlsoni* Rudman, 1978. *Halgerda carlsoni* is covered with fine red specks rather than a network of lines.

The rounded glandular mass on the vaginal duct and the large penial sheath found in *Halgerda batangas* are similar to those shown by Willan & Brodie (1989:figs. 7, 8) for *H. aurantiomaculata* (Allan, 1932). They differ in that the glandular mass in *H. aurantiomaculata* is at the middle of the vaginal duct, whereas that in *H. batangas* is at the end of the duct. The penial sheath in *H. aurantiomaculata* is relatively larger than that of *H. batangas*.

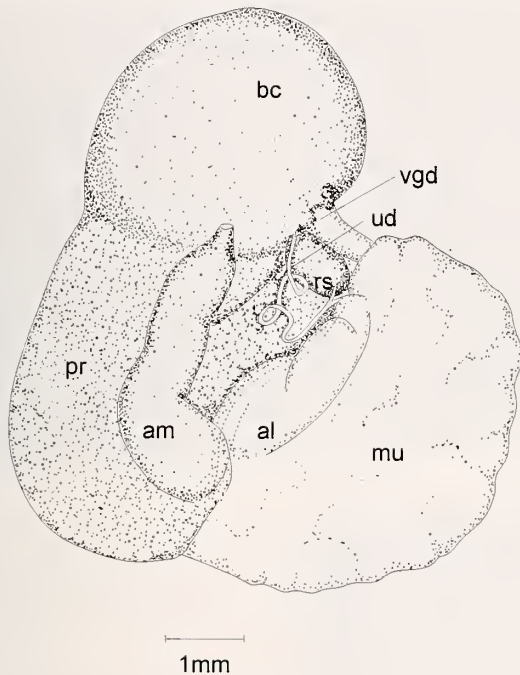


Figure 10

*Halgerda batangas* Carlson & Hoff, sp. nov. Reproductive system: al, albumin gland; am, ampulla; bc, bursa copulatrix; mu, mucous gland; pr, prostate; rs, receptaculum seminis; ud, uterine duct; vgd, vaginal duct.

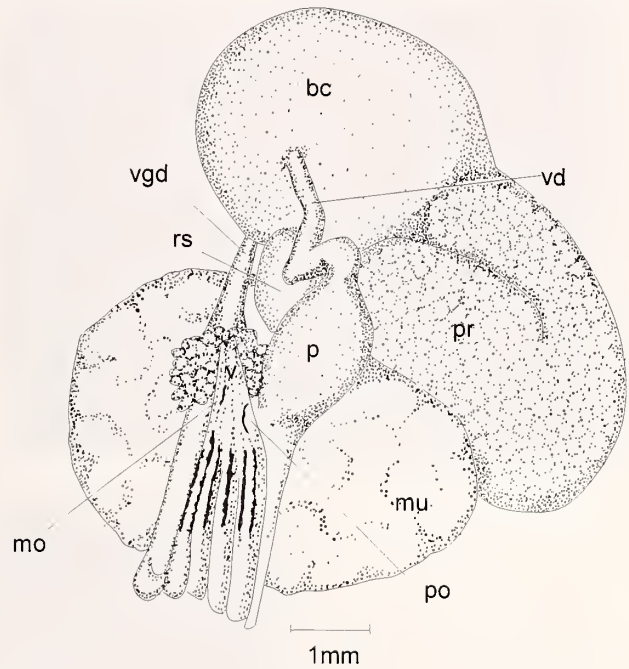


Figure 11

*Halgerda batangas* Carlson & Hoff, sp. nov. Reproductive system: bc, bursa copulatrix; mo, mucous gland opening; mu, mucous gland; p, penial sheath; po, penial opening; pr, prostate; rs, receptaculum seminis; v, vagina (opened to show folds); vd, vas deferens; vgd, vaginal duct.

**Etymology:** The specific name *batangas* is taken from the locale in the Philippines where this species is commonly seen and where three of the specimens in the paper were collected.

*Halgerda johnsonorum*, Carlson & Hoff, sp. nov.

(Figures 12, 13, 15–17)

**Distribution:** *Halgerda johnsonorum* has been recorded only from Kwajalein Atoll in the Marshall Islands.

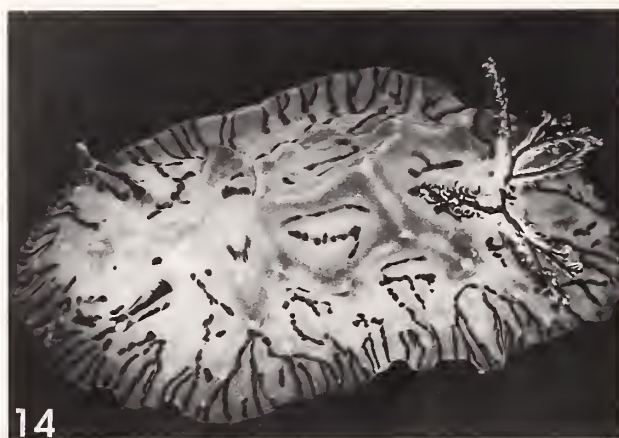
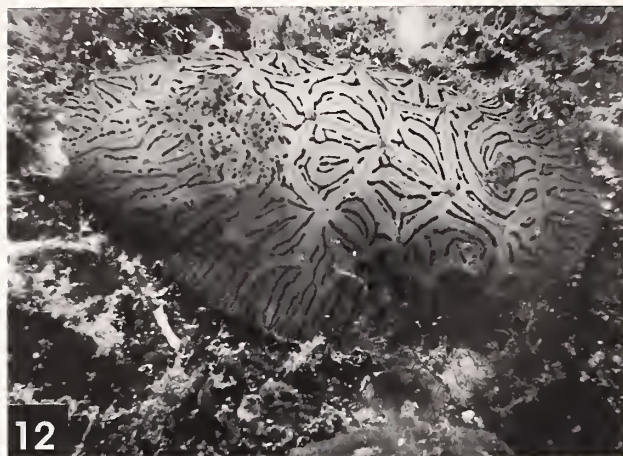
**Material:** Four specimens from the Ennubuy-Ennylabe-gan reef area of Kwajalein Atoll in the Marshall Islands were furnished by Scott and Jeanette Johnson. The specimens were found at night at a depth of 12 to 15 m; two in a small cave, and two in a surge channel ledge. (All sizes are from preserved material). 28 mm, 28 January 1989; deposited as holotype, Bishop Museum, Honolulu, BPBM 253725; 27 mm, 9 April 1993; opened dorsally; deposited as paratype, Bishop Museum, BPBM 253726; 20 mm, 15 October 1988; dissected; deposited as paratype, Bishop Museum, BPBM 254046; 25 mm, 2 July 1989; retained by authors; *Halgerda willeyi* Eliot, 1904. 98 mm (live measurement); Seragaki, Okinawa, 76 m; 22 July 1996; furnished by Dr. Robert Bolland; dissected for

comparative purposes. Deposited in Bishop Museum 254047.

**External morphology:** Color transparencies of the living animals (Figures 12, 13) show that they are broadly ovate with a relatively low profile compared to other *Halgerda*. The mantle lies on the substrate. The surface has a texture like that of other *Halgerda*, but the overall body is somewhat soft and flaccid, not the expected stiff and gelatinous. There are low ridges on the dorsum with little, if any, sign of depressions between them. Their points of juncture are not marked by noticeable tubercles. The ridges that extend toward the mantle edge tend to become intermittent. Both rhinophores and branchia arise out of low smooth sheaths. The rhinophore club is narrower than the base and has a slight posterior angulation. The branchia is divided into four main gills with the posterior two being secondarily divided.

The body varies from translucent white to translucent purplish gray. The ridges are yellow, becoming more intense at the points of juncture. The area between the ridges has dark brown and yellow lines. These lines form different shapes within the areas enclosed by the ridges but mid dorsally quite often run somewhat longitudinally. From the outer lateral ridges the lines radiate to the mantle margin with the yellow lines becoming smaller, inter-





Figures 12–14

*Halgerda johnsonorum* Carlson & Hoff, sp. nov. Figure 12. Holotype (BPBM 253725). Length 28 mm (preserved). Kwajalein, Marshall Islands, 28 January 1989. Figure 13. Paratype (BPBM 253726). Length 27 mm (preserved). Kwajalein, Marshall Islands, 9 April 1993. (anterior mantle damaged) Photos by Scott Johnson. Figure 14. *Halgerda willeyi*, (BPBM 254047) Length 98 mm. Seragaki, Okinawa, 76 m. 22 July 1996. Photo by Robert Bolland.

mittent, and rarely reaching the edge. The brown lines reach the margin, quite often branching before doing so. The branchia are translucent white with dark brown spots. The rhinophore sheath has a yellow margin; the branchial sheath is unmarked. The rhinophore base and lamella are translucent white with dark brown spots. A dark brown line marks the posterior of the base.

In the preserved specimens the brown markings are retained; but the yellow is lost. A few lines on the underside of the mantle extend from the juncture of mantle and body wall to the edge of the mantle. The sides of the body have vertical brown lines and/or spots on the upper half and lines just above the foot. The top of the foot has numerous brown lines, some a continuation of the lines from the body. On some specimens brown lines appear on the bottom of the foot. A few brown lines lead into the genital pore.

**Internal morphology:** The visceral sac is transparent with some sparse brown flecks. The general arrangement of the internal organs is typical of the genus. On the 27-mm specimen part of the whitish ampulla and the dark brown bursa copulatrix were covered by the prostate. The esophagus and aorta both crossed the top of the bursa.

The oral tube is spotted in one specimen and unspotted in another. The radular sac curls up and to the right. The radula of the dissected specimen was about 5.5 mm long with a formula of  $37 \times 46.0.46$ . The outer six teeth (Figure 15) are reduced in size with the outer three flattened and the penultimate bifid.

Within the reproductive system (Figures 16, 17) the slightly coiled ampulla is short and most is embedded in the prostate gland. The uterine duct has one simple fold between its connection to the bursa copulatrix and the large albumin/mucus gland complex. The small ovoid re-

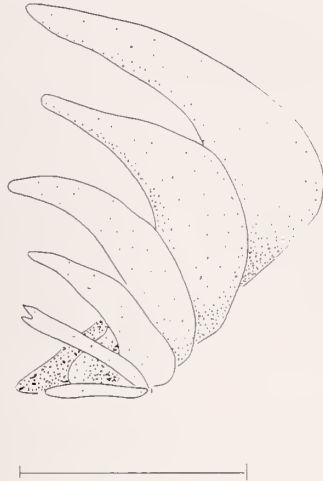


Figure 15

*Halgerda johnsonorum* Carlson & Hoff, sp. nov. Paratype (BPBM 254046). Length 20 mm (preserved). Radula-outer laterals. Scale = 100  $\mu$ m.

ceptaculum seminis is buried in the prostate gland. The bursa copulatrix is entirely covered by the large prostate gland with a large heavy part of the prostate extending around and to the base of the bursa copulatrix. The bursa copulatrix and albumin/mucus gland are relatively large. A thin vas deferens extends from the prostate gland on top of the bursa to the long, slightly widened penial sheath. The vaginal duct widens only slightly at the genital vestibule. Folds at the genital opening extend through the body wall and line the common genital vestibule. Short brown lines appear externally and within the genital vestibule.

**Discussion:** *Halgerda johnsonorum* differs from all other species of *Halgerda* the authors have examined in that it is somewhat soft and flaccid. In color, it is most similar to *H. willeyi* Eliot, 1904 (Figure 14) and could be mistaken for that species if viewed only externally. Both have dark longitudinal lines mid-dorsally and dark lines radiating to the edge of the mantle margin. Both have dark lines under the mantle edges and along the top of the foot with the bottom of the foot being white. Both have yellow lining the ridges and deeper yellow at the juncture of the tubercles. In external coloration they differ slightly in that *H. johnsonorum* has brown spots and stripes along the sides of the body under the mantle, whereas *H. willeyi* has no markings in that area. *Halgerda johnsonorum* has brown spots over rhinophores and branchia, whereas *H. willeyi* has dark brown stripes on both. In external morphology they are distinct in that *H. willeyi* has very pronounced ridges and tubercles and, is stiff and gelatinous.

The genital system for the *H. willeyi*, dissected for comparative purposes by the authors (Figures 18, 19), was as drawn by Eales (1938) except that the small gland

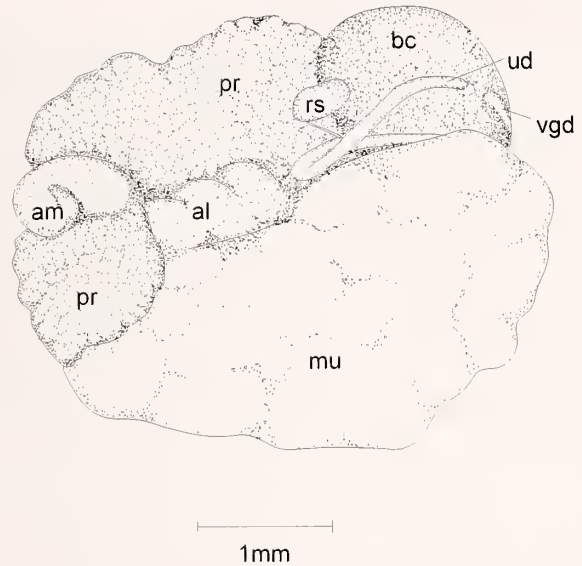


Figure 16

*Halgerda johnsonorum* Carlson & Hoff, sp. nov. Reproductive system: al, albumin gland; am, ampulla; bc, bursa copulatrix; mu, mucous gland; pr, prostate; rs, receptaculum seminis; ud, uterine duct; vgd, vaginal duct.

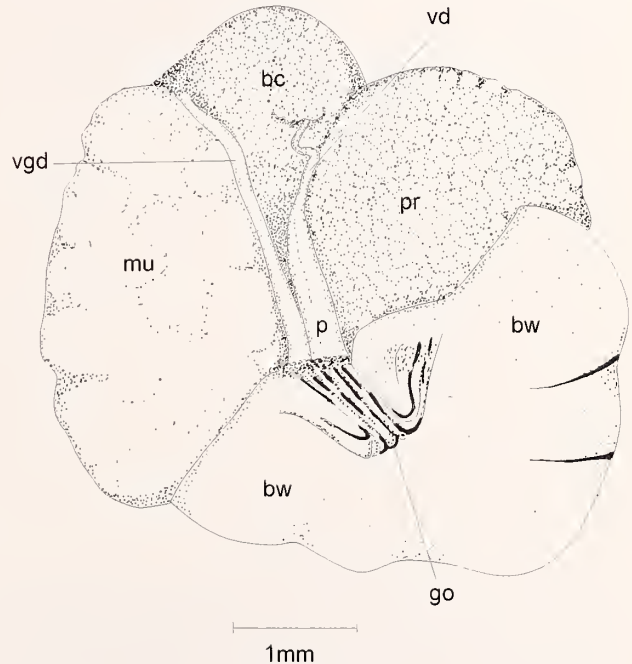
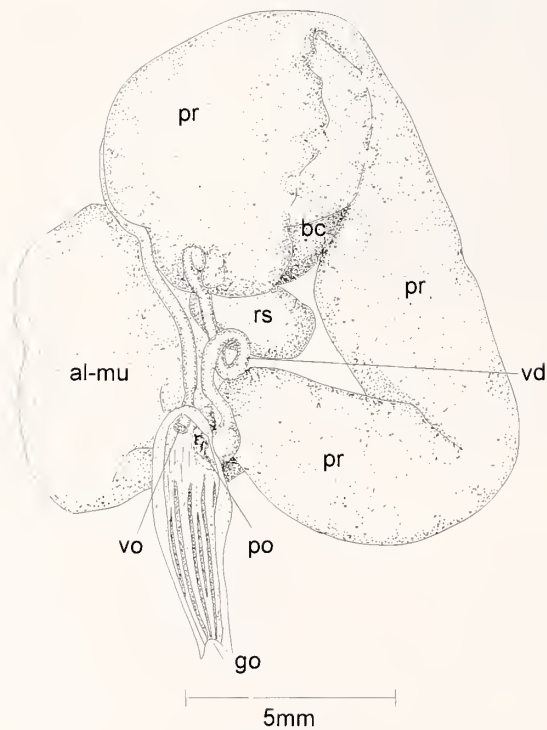
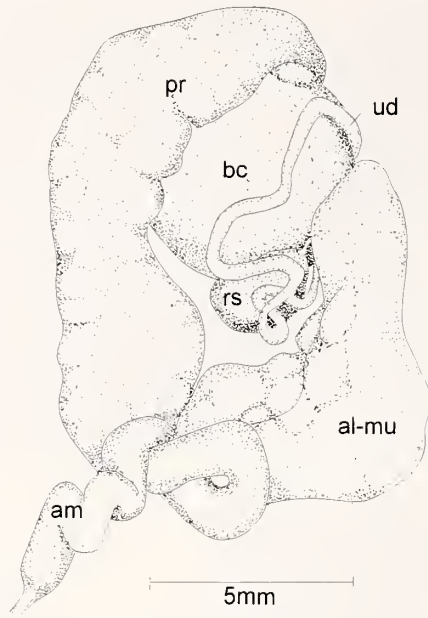


Figure 17

*Halgerda johnsonorum* Carlson & Hoff, sp. nov. Reproductive system: bc, bursa copulatrix; bw, body wall; go, genital opening; mu, mucous gland; p, penial sheath; pr, prostate; vd, vas deferens; vgd, vaginal duct.





Figures 18, 19

*Halgerda willeyi*, (BPBM 254047) Length 98 mm. Reproductive system: al-mu, albumin-mucus gland; am, ampulla; bc, bursa copulatrix; go, genital opening (opened to show folds); po, penial opening; pr, prostate; rs, receptaculum seminis; ud, uterine duct; vd, vas deferens; vo, vaginal opening.



Figure 20

*Halgerda willeyi*, (BPBM 254047) Length 98 mm. Radula-outer laterals. Scale = 100  $\mu$ m.

masses near the termination of the penial sheath were not as clearly defined as those shown by Eales. *Halgerda willeyi* differs significantly from *H. johnsonorum* in that the ampulla is large, long, convoluted, and not covered by the prostate gland. The uterine duct is sinuous and loops completely around the bursa copulatrix which is only partially covered by the prostate gland. The receptaculum seminis is comparatively larger than in *H. johnsonorum*. The penial sheath is short where it widens before entering the genital vestibule. Thin folds of tissue, rather than the larger heavy folds of *H. johnsonorum*, line the common genital vestibule.

The radulae also differ in that *H. willeyi* has three simple reduced outer laterals (Figure 20), whereas *H. johnsonorum* has six, the outer three flattened with the penultimate being bifid.

**Etymology:** The species is named for Scott and Jeanette Johnson who graciously furnished specimens and color transparencies.

### DISCUSSION

The previously described *Halgerda* have had a smooth, stiff gelatinous texture. This is true of *H. okinawa* and *H. batangas*, but *H. johnsonorum*, while being smooth, is soft and flaccid with a thin body wall and dorsum. Rudman (1978) discussed a dark-colored visceral sac (fibrous envelope) in four of the five species he studied. Of the three species described in this paper, *H. batangas* is dark while *H. okinawa* and *H. johnsonorum* are lightly pigmented. Willan & Brodie (1989) reported a lightly pigmented visceral sac for *H. aurantiomaculata* (Allan, 1932) as did Carlson & Hoff (1993) for *H. guahan*, *H. malleoso*, and *H. brunneomaculata*. A major characteristic

of the *Halgerda* is a prostate-covered, or mostly covered, bursa copulatrix. *Halgerda okinawa* has a heavy band of the prostate that wraps over the bursa leaving both sides uncovered. This is the least coverage of the bursa copulatrix of any of the described *Halgerda*.

In addition to *Halgerda batangas* and *H. aurantiomaculata*, a glandular mass surrounding the vagina has also been reported for two other *Halgerda*: *H. terrantuentis* Bertsch & Johnson, 1982 (Kay & Young, 1969:fig. 28 [as *H. sp. cf. graphica*]) and *H. malesso* Carlson & Hoff (1993:fig. 15). These two species have large saclike vaginas rather than the tubular forms found in *H. aurantiomaculata* and *H. batangas*.

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